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*Water*  
*Pollution*  
*Survey*

THE  
ONTARIO WATER RESOURCES  
COMMISSION



WATER POLLUTION SURVEY

of the

COMMUNITY OF RICHARD'S LANDING

TOWNSHIP OF ST. JOSEPH

1969

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R E P O R T

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WATER POLLUTION SURVEY

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COMMUNITY OF RICHARD'S LANDING

Township of St. Joseph

Ontario Water Resources Commission

District Engineers Branch

Division of Sanitary Engineering

July 1969

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## R E P O R T

### ONTARIO WATER RESOURCES COMMISSION

#### 1. INTRODUCTION

A water pollution survey of Richard's Landing, in the Township of St. Joseph, was carried out during July, 1969. This study coincided with a detailed survey of the St. Marys River carried out by the Water Quality Surveys Branch of the Ontario Water Resources Commission.

#### 2. BACKGROUND

The public beach area serving Richard's Landing was declared unsafe for swimming at the close of the 1968 summer season. At that time the Commission informed the Women's Institute and other involved persons in the area that a detailed survey would be carried out in the area during the summer of 1969. Since it was alleged that a certain pollution source existed due to the City of Sault Ste. Marie sewage treatment facility outfall located some twenty miles upstream of the beach area, the Water Quality Surveys Branch aided in collecting samples along the entire length of the St. Marys River. Some pertinent results of that survey are included in this report.

### 3. SCOPE OF SURVEY

The main part of the survey was confined to the Community of Richard's Landing since it was thought that the possibility of pollution reaching Richard's Landing from the Sault Ste. Marie sewage treatment plant was very remote. Coliform bacteria associated with the past closure of the beach probably originated locally since their chances of surviving a distance of over twenty miles were considered rare and since the dilution factor involved was so great.

The survey was consequently confined to the urban area of the community in, and immediately adjacent to, Richard's Landing. It involved the examination and sampling of local water courses and sewer outfalls, interviews with municipal officials and the Algoma District Health Unit, and a review of Commission files. The information as well as the analytical results of all samples obtained during the survey were evaluated to determine the measurer required to prevent a re-occurrence of the situation.

### 4. DESCRIPTION OF AREA

Richard's Landing is located on the shore of a large bay situated on the northern section of the Township of St. Joseph on St. Joseph Island. Access to the island is

only by boat and a ferry, operated by the Department of Highways. Cars are carried across the St. Joseph Channel for use on several miles of public highway on the island.

John Richards owned much of what is now Richard's Landing and in 1878 the community which gradually settle there was incorporated. Approximately 300 persons reside in the area on a year round basis although the population increases during the summer month because of the many tourist attractions. The built-up or urban area is basically residential with a small commercial area located at the north end of Richard Street. A Red Cross Hospital is also situated on this street which ends on a government-owned dock extending into the St. Marys River.

The entire area is drained mainly by a system of shallow roadside ditches with slight gradients and discharging ultimately to the River. Covered storm drains have been provided along Richard and Lucy Streets.

## 5. EXISTING SERVICES

### Water Supply

The community is presently served by individual wells of either the "dug", "driven", or "drilled" types. There is no known communal water supply system present in Richard's Landing.

### Waste Disposal

Private septic tank systems are generally being used for disposal of domestic wastes and the installation of these units have only recently been supervised by the Algoma Health Unit. There is no sanitary sewerage system in the community.

### 6. RESULTS OF SURVEY

Analytical results of the samples collected during the survey are presented in Table I and the sampling locations are shown on the accompanying map of the study area. An explanation of the various parameters used and their significance is given in Appendix A.

The common indicators of domestic wastes are biochemical oxygen demand (BOD), coliform organisms, and anionic detergents (ABS). The Commission's objectives for the first two parameters are 4 ppm and 2,400 per 100 ml respectively when natural watercourses are involved. The presence of A.B.S. in any concentration indicates pollution from a domestic source.

The appended results show that the BOD at 25 percent of the sampling locations were in excess of the objectives and the coliform bacteria concentrations exceeded the objective in 63 percent of the samples. Faecal coliforms were



TABLE I  
TOWNSHIP OF ST. JOSEPH

RICHARD'S LANDING

NO.	LOCATION	DATE	C H E M I C A L   A N A L Y S E S				BACTERIOLOGICAL ANALYSES	
			5-Day BOD (ppm)	S.S. (ppm)	ABS (ppm)	PHENOLS (ppm)	COLIFORMS PER 100 ml TOTAL	FAECAL
1-D*	drainage ditch west of beach	July 17	5.0	20	0	5	46,000	460
2-L	beach	July 17	6.8	5	0	8	100	10
3-L	Courtne's Marina	July 17	0.4	5	0.1	0	25	0
4-D	drainage ditch east of Marina	July 17	1.8	5	0.1	0	500,000	3,000
5-L	Government dock	July 17	0.6	5	0	0	50	0
6-L	Red Cross Hospital	July 17	5.0	40	9	90	11,000,000	390,000
7-D	Ditch No. 1 east of Richard Street	July 17	1.0	15	0	9	200,000	18,000
8-D	Ditch No. 2 east of Richard Street	July 17	2.5	15	0	7	5,000	100

\* D & L indicate Ditch and Lake samples, respectively

present in 75 percent of all samples analysed and a positive ABS test was obtained in 38 percent of the locations.

## 7. DISCUSSION

### A. Significance of Results

During 1968 and 1969 members of our Great Lakes Surveys Programme carried out two surveys of the St. Marys River system. In 1968 total coliform values varied from ten to 980 organisms per 100 ml at approximately 23 miles upstream of Richard's Landing while values of from 0 to 30 organisms per 100 ml were recorded only one mile upstream of the community.

These surveys indicate that there is an actual decrease of coliform organisms in the St. Marys River as it flows from Sault Ste. Marie through Little Lake George and on towards St. Joseph Island. This situation shows that pollution from the sewage treatment plant in Sault Ste. Marie is not reaching the Richard's Landing area and that coliform counts in the ranges obtained during this pollution survey indicate the source of pollution to be from local sources.

Of greatest concern is the Red Cross Hospital and recommendations have already been made by this Commission that this problem be resolved immediately.

The drainage ditches on either side of the beach area contain high concentrations of total and faecal coliforms. That on the east side indicated total counts of 500,000 per 100 m. while the west ditch contained 46,000 per 100 ml. These ditches, because of their proximity to the beach area and their coliform organism concentrations, could account for the local condition which contaminated the swimming area during the 1968 season. Both sources also showed the presence of faecal coliform organisms.

The two storm sewers located east of Richard Street and running parallel to it also contain high concentrations of total and faecal coliforms. This indicates that perhaps effluents from malfunctioning sewage disposal systems in this area are gaining access to the drainage ditches.

Although chemical analyses were not performed to establish the nutrient levels in the water associated with these drainage ditches, a visual examination of the area indicated the presence of a large quantity of aquatic weeds. If this condition persists for an extended period of time, a critical algae problem may develop and the entire shoreline, including the beach area, could be covered with algae growths.

B. Corrective Actions

The residents of Richard's Landing should review the operation of their sewage disposal systems and make all necessary changes to ensure proper treatment of their wastes. Technical advice and help in this regard is available from the Algoma Health Unit in Sault Ste. Marie. Staff of that Unit should be contacted in regard to sizing of the units, soil testing, and other pertinent parameters involved.

Should the results of this programme be ineffective the only other alternative, although very costly, would be the construction of a communal collector system with associated treatment facilities.

8. SUMMARY AND CONCLUSION

On July 17, 1969, a pollution survey of Richard's Landing was carried out. The results of that survey were combined with two studies carried out by the Great Lakes Surveys Programme because the possibility of pollution from the Sault Ste. Marie sewage treatment plant was discussed.

The results of all surveys indicated that the source of bacteriological pollution is of local origin and probably due to malfunctioning septic tank systems and/or discharges of raw sewage into the storm drainage ditches.

9. RECOMMENDATIONS

1. All malfunctioning septic tank systems should be repaired in co-operation with the Algoma Health Unit and any discharge of raw sewage into the storm drainage ditches be curtailed.
2. If pollution continues following completion of this programme, a communal sewerage system must be installed.

/sg

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APPENDIX A

TOWNSHIP

of

ST. JOSEPH

RICHARD'S LANDING

- Definition of Terms -

## APPENDIX A

### DEFINITION OF TERMS

#### BOD (Biochemical Oxygen Demand)

The Biochemical Oxygen Demand (BOD) is a measure of the amount of oxygen required for the natural stabilization of decomposable organic matter present in sewage. OWRC objectives allow concentrations in natural waters and waste discharges of no greater than 4.0 and 15.0 ppm (parts per million) respectively.

#### ABS (Alkylbenzene Sulphonate)

The Alkylbenzene Sulphonate (ABS) is a surfactant extensively used in detergents and so is present in domestic sewage at levels averaging approximately 10 ppm. Rivers usually contain trace quantities of about 0.1 ppm while ground water supplies range from zero to several parts per million depending upon the pollution of the aquifer by domestic wastes.

#### SOLIDS

The solids content of a liquid is expressed as total, suspended, and dissolved solids. The latter is determined by subtracting the first two solids and all three are expressed in ppm. The suspended solids figure is the most important since it represents that portion which is carried down-current and later deposited. The OWRC's objective for discharge of this material is a concentration less than 15 ppm.

### PHENOLS

Phenolic wastes arise from the distillation of wood, from gas works, coke ovens, oil refineries, chemical plants, most oil products, and from human and animal wastes. The problems most commonly associated with phenols are those of tastes and odours. This is especially noticeable when combined with chlorine. The OWRC recommends that an alternate drinking supply should be made available, should a more suitable one exist, if the concentration of phenol exceeds 0.001 ppm.

### TOTAL COLIFORMS

Coliform bacteria are commonly found in the intestinal tract of man and other animals. They are therefore used as an indication of pollution. In polluted water, their concentration is roughly proportional to the degree of sewage contamination present. The acceptable limit for natural watercourses is a concentration of less than 2400 organisms per 100 millilitres of water.

### FECAL COLIFORMS

The fecal coliforms are coliform bacteria usually associated only with the fecal discharges of man and other warm blooded animals and as such their presence indicates positive excretion into the water body. When this coliform is present in a water, it is assumed that the water is potentially dangerous.



APPENDIX B

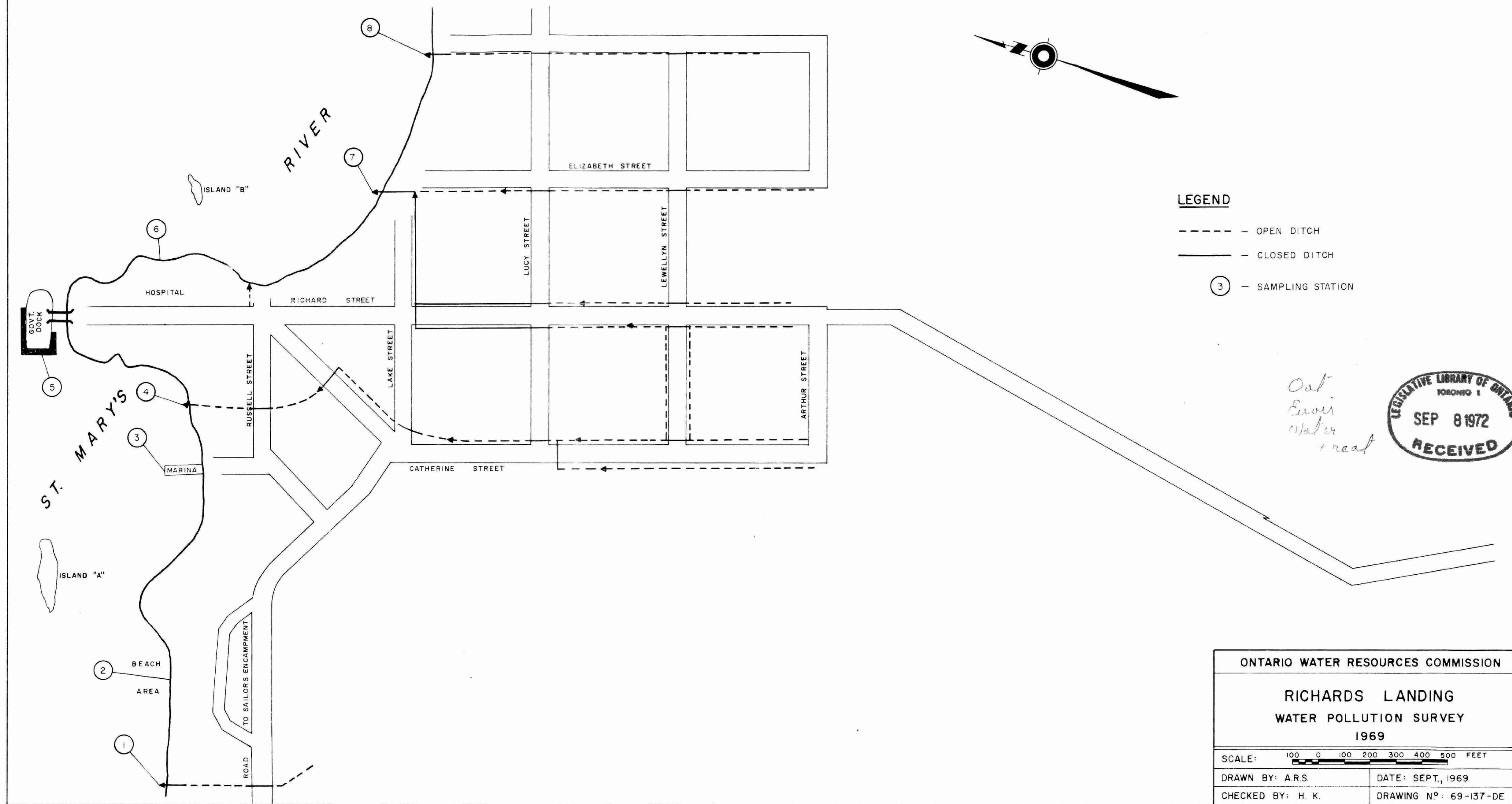
TOWNSHIP

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RICHARD'S LANDING

- Map -





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